UMaryland iGEM Executive Summary: 2015 Competition

UMaryland iGEM is a gold-medal winning synthetic biology team at the University of Maryland, College Park. It will be competing against 280 other student-led university teams from around the world in the annual *International Genetically Engineered Machine (iGEM)* competition this September in Boston, Massachusetts.

The multidisciplinary team consists of sixteen undergraduates, three graduate student advisors, and three faculty advisors from the *College of Computer, Mathematics, and Natural Sciences, A. James Clark School of Engineering, Robert H. Smith School of Business,* and *College of Agriculture and Natural Resources*. The undergraduate students handle the great majority of the project, including defining the project proposal, fundraising, planning and executing the experimental design, engaging in community outreach, and evaluating the impact of the research on local and international stakeholders.

UMaryland iGEM seeks to conduct research projects that would help the health and well-being of the community and environment. This year, the primary research focus is combating age-related macular degeneration (AMD). According to the National Institutes of Health, the estimated number of people with AMD is expected to increase from 196 million in 2020 to 288 million by 2050 worldwide. Lutein has been shown to be an effective treatment, but the current method of extracting it from the petals of marigolds is costly and produces a low-purity product. The goal of *UMaryland iGEM* is to engineer *E. coli* to produce lutein at a much higher rate than the established method.

Alongside research, *iGEM* emphasizes human practices, which include biological safety, community outreach, and education. The team has already met with hospitals, clinics, and pharmaceutical companies to gather their ideas on the project. In addition, *UMaryland iGEM* is becoming a leader within the *iGEM* community by this year hosting a Mid-Atlantic *iGEM* conference on June 25th to facilitate inter-team collaboration. Five local university teams and one high school team will participate in presenting their research and hearing from guest speakers including the FBI.

To achieve research and outreach goals, the team needs additional support. This year's fundraising target is $50,000, which includes approximately $20,000 for registration, $10,000 for research material costs, $12,000 for travel related expenses, and $8000 for undergraduate stipends.

Genetic engineering and biotechnology has proven a rapidly growing industry as evidenced by its funding from many Fortune 500 companies. Additionally, many government entities, including the NIH, NSF, DARPA Living Foundries, IARPA, ONR, NASA and ARL sponsor research in the field. Sponsoring *UMaryland iGEM* is not only an opportunity to advance the field in the region, but also a crucial step towards inspiring and developing the next generation of scientists and bioengineers.